

3-21-2003

Transmission of *Mycobacterium Tuberculosis* Associated with Failed Completion of Treatment for Latent Tuberculosis Infection - Chickasaw County, Mississippi, June 1999-March 2002

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Publication Info

Published in *Morbidity and Mortality Weekly Report*, Volume 52, Issue 11, 2003, pages 222-224.

Chamblee, T., Hartley, D., Holcombe, M. Parham, K., Upchurch, P, Webb, R. M., ... Dewan, P. K. (2003). Transmission of *Mycobacterium Tuberculosis* associated with failed completion of treatment for latent tuberculosis infection - Chickasaw County, Mississippi, June 1999-March 2002. *Morbidity and Mortality Weekly Report*, 52(11), 222-224.

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overseas screening of immigrants and refugees, 2) enhance the notification system that alerts local health departments to the arrival of immigrants or refugees with suspected TB to improve diagnosis and treatment, 3) establish a binational TB referral and case management system for the United States and Mexico to improve treatment completion by TB patients who cross the United States–Mexico border (the U.S.–Mexico Binational TB Referral and Case Management Project), 4) identify and treat persons arriving from high-incidence countries who have latent TB infection, and 5) strengthen collaborations with the World Health Organization and other international partners aimed at improving TB control in high-incidence countries (the STOP TB Partnership). In support of these efforts, CDC and its 22 partner research institutes, clinical centers, and health departments in the United States and Canada that compose the Tuberculosis Epidemiologic Studies Consortium have initiated a study to identify missed opportunities for TB prevention among foreign-born persons.

Although intensified TB control efforts helped reduce the TB case rate in the U.S.-born non-Hispanic black population by approximately 70% during 1992–2002, that rate has remained approximately eight times higher than the rate among non-Hispanic whites. Because much of this disparity is associated with socioeconomic status (9), intensified outreach programs tailored to the needs of low-income persons might accelerate TB elimination. CDC is funding demonstration projects in South Carolina, Georgia, and Chicago, Illinois, to identify innovative strategies to improve TB screening, diagnosis, and treatment adherence in high-risk black communities.

Elimination of health disparities is one of the national health goals for 2010 (Goal 2) (10). Closing the gaps in TB rates will help achieve this and the goal of TB elimination.

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Transmission of *Mycobacterium Tuberculosis* Associated with Failed Completion of Treatment for Latent Tuberculosis Infection — Chickasaw County, Mississippi, June 1999–March 2002

During June 1999–March 2002, a total of 16 tuberculosis (TB) cases were reported from Chickasaw County, Mississippi (2000 population: 19,440), corresponding to annual TB incidences of 20.5–27.6 cases per 100,000 population. In comparison, annual TB incidences for Mississippi during the same period decreased from 7.8 to 5.4 cases per 100,000 population. This report summarizes the results of an investigation of the patients and their contacts and demonstrates the need for strategies to increase the proportion of infected contacts that successfully complete treatment for latent TB infection (LTBI).

During April–May 1, 2002, the Mississippi State Department of Health (MSDH) conducted an epidemiologic investigation of the high incidence of TB in Chickasaw County. Patients were interviewed, and health department medical records were reviewed for clinical data. Restriction fragment length polymorphism (RFLP) analysis using IS6110 was performed on all culture isolates. For contacts, LTBI was defined as infection in a patient with a tuberculin skin test (TST) ≥ 5 mm induration and no evidence of TB disease. Contact investigation logs were reviewed and health department records used to establish outcomes of treatment for LTBI.

The median age of the 16 TB patients was 31 years (range: 2–64 years); five (31%) were aged <16 years. Ten (63%) patients were male, and 15 (94%) were black. All 16 TB patients were born in the United States and were human immunodeficiency virus (HIV)-seronegative. For 11 patients from whom sputum specimens were obtained for bacteriologic examination, eight (73%) were culture-positive for *Mycobacterium tuberculosis*, of whom six (55%) also were sputum-smear positive for acid-fast bacilli. RFLP analysis performed on all eight culture-positive isolates showed seven (88%) with matching 10-band patterns. The contact investi-

gations and matching RFLP patterns suggest recent transmission of *M. tuberculosis*. Isolates from all culture-confirmed patients were susceptible to first-line anti-TB drugs (isoniazid, rifampin, pyrazinamide, and ethambutol). All 16 patients successfully completed a CDC-recommended course of treatment.

Among the 16 TB patients, five had been diagnosed previously with LTBI as a result of TB contact investigations; patients ranged in age from 28 to 51 years, and four (80%) had a history of regular alcohol use. MSDH attempted to treat all five patients, but all had either refused or stopped treatment. The patients subsequently progressed to active TB and became sources of infection for an additional 10 TB patients, including the five patients aged <16 years.

The 16 TB patients identified 364 contacts (median: 19 contacts per case; range: 6–90). The patients, with the assistance of a health department worker, classified 350 (96%) of these contacts as either close (63%) or casual (37%). The 364 contacts represented 253 persons. As of May 1, 2002, TST screening, including if indicated a 10–12 week follow-up TST, was completed for 230 (91%) of the 253 persons. TST screening results and subsequent evaluation (including chest radiograph, and if indicated, sputum examination) detected LTBI in 67 (26%) persons. Patients with LTBI were not offered HIV testing and counseling routinely.

Adults with LTBI were offered a 9-month regimen of daily self-administered isoniazid, dispensed at 1-month increments. Directly observed treatment for LTBI was offered both to children and those adults with known HIV infection. Treatment for LTBI was defined as complete if the patient had retrieved ≥ 6 months of isoniazid and was assessed by a supervising nurse as having completed treatment. Among the 67 persons with LTBI diagnosed, treatment was initiated in 57 (85%), discontinued in nine (13%) because of side effects, and completed in 36 (54%).

As a result of this investigation, patients in Chickasaw County with untreated LTBI were again offered treatment. To enhance completion of treatment for LTBI, MSDH hired additional outreach workers and expanded the use of direct observation of treatment for LTBI. MSDH staff targeted the use of direct observation to adult patients considered at high risk for treatment default, including persons who regularly used alcohol and those who had interrupted treatment previously. MSDH also is considering the use of incentives such as grocery coupons.

To identify barriers to LTBI treatment completion, MSDH in partnership with CDC, conducted three focus groups with TB-control staff, patients adherent to treatment for LTBI, and patients nonadherent to treatment for LTBI. Focus group participants suggested that TB-control staff persistence and

flexibility helped adherence to treatment for LTBI, as did participation of sex and race-matched community outreach workers. Many participants cited community and family stigma as treatment barriers and identified a need for additional information about the importance of LTBI treatment.

To address patient concerns and misconceptions, MSDH has initiated ongoing individual counseling during treatment for LTBI. Furthermore, MSDH has engaged community leaders, churches, and civic organizations to disseminate TB-related educational messages.

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Editorial Note: The findings in this investigation underscore the need to ensure completion of treatment for LTBI by infected contacts of TB patients. Integral components of successful contact investigations include patient interview, contact identification, and medical evaluation for active TB and LTBI (1), followed by successful initiation and completion of treatment for LTBI.

This investigation found that contact identification and evaluation were thorough and effective. For example, the median number of contacts identified and the proportion of contacts evaluated for LTBI were higher than those found in five other TB programs in a recent study of contact investigations (1,2). Despite these efforts, patients with untreated LTBI subsequently developed active TB and served as the source of ongoing TB transmission in the community. This contributed to the persistently high TB incidences in Chickasaw County.

The discovery of LTBI during contact investigation suggests recent infection. Because the risk for progression from infection to active disease is highest during the first 2 years following infection, priority should be given to treating infected contacts identified during contact investigations (3). Studies among populations at highest risk for loss to follow-up (e.g., injection-drug users, released jail inmates, and homeless persons) have shown that the use of incentives and direct observation of treatment substantially improves LTBI treatment completion rates (4–7). Among high-risk groups, these interventions might be cost-effective (8). Additional evaluation is needed to determine if patients outside these high-risk groups might benefit from incentives and direct observation of treatment. Qualitative evaluation of patient, staff, and sys-

tem barriers might identify community-specific barriers to treatment initiation and completion. In Chickasaw County, focus group findings suggested that ongoing individual counseling for patients with LTBI and efforts to reduce stigma through community engagement might promote completion of treatment for LTBI. A follow-up evaluation might help determine the effectiveness of these interventions.

Completion of treatment for LTBI is the final component of an effective contact investigation. If the actual number of infected contacts substantially exceeds those identified and successfully screened, the treatment completion rate might overestimate the contact investigation effectiveness (2). To effectively interrupt *M. tuberculosis* transmission, successful implementation of all elements of contact investigation is necessary (8). Treating patients with LTBI increasingly challenges the response capacity of state and local TB-control programs (9). Although the decline of TB in blacks has paralleled the overall national trends, in 2001, incidence among non-Hispanic blacks remained 8.6 times higher than incidence among whites (10). TB-control programs serving black communities with high TB incidence should have the resources necessary to control TB and reduce this health disparity.

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Update: Influenza Activity — United States, 2002–03 Season

This report summarizes influenza activity in the United States during September 29, 2002–March 8, 2003,* and updates the previous summary (1). Influenza activity was mild in the United States overall but varied by region. Preliminary data collected through the four components of the CDC influenza surveillance system suggest that national influenza activity peaked during the week ending February 8, 2003 (2).

As of the week ending March 8, the World Health Organization (WHO) and National Respiratory and Enteric Virus Surveillance System collaborating laboratories in the United States tested 59,731 specimens for influenza viruses, of which 6,433 (10.8%) were positive. The percentage of specimens testing positive for influenza exceeded 10.0% during the week ending January 18 and appears to have peaked at 25.0% during the week ending February 8. During the three most recent influenza seasons (1999–00, 2000–01, and 2001–02), the peak percentage of specimens testing positive for influenza ranged from 23.9% to 30.9% (3; CDC, unpublished data, 2003). Of the 6,433 influenza viruses reported during the 2002–03 season, 2,916 (45.3%) were influenza type A and 3,517 (54.7%) were influenza type B viruses. However, during the weeks ending February 22–March 8, influenza A viruses have been reported more frequently (57.0%) than influenza B viruses. Of the 1,329 influenza type A viruses that have been subtyped, 1,089 (81.9%) are influenza A (H1N1)[†] viruses and 240 (18.1%) are influenza A (H3N2) viruses. For the season, influenza type A viruses have predominated in the New England, East North Central, Mountain, Pacific, and Mid-Atlantic regions, and influenza B viruses have predominated in the West South Central, South Atlantic, West North Central, and East South Central regions. However, during the weeks ending February 22–March 8, influenza A viruses were reported more frequently (71.1%) in the West South Central region than influenza B viruses.

CDC has characterized antigenically 266 influenza viruses submitted by U.S. laboratories since September 29, 2002: 65 influenza A (H1N1) viruses, 54 influenza A (H3N2) viruses, and 147 influenza B viruses. Of the 65 influenza A (H1N1) viruses, 45 (69.2%) had the N1 neuraminidase and 20 (30.8%) had the N2 neuraminidase. The hemagglutinin proteins of all 65 influenza A (H1N1) viruses were similar antigenically to the hemagglutinin of the vaccine strain A/New Caledonia/20/99 (H1N1). Of the 54 influenza A (H3N2) isolates that have been characterized, 47 (87.0%) were similar to A/Panama/2007/99, the H3N2 component of the 2002–03 influenza vaccine, and seven (13.0%) showed reduced

* As of March 14, 2003. Reporting is incomplete.

[†] Includes both the A (H1N1) and A (H1N2) influenza virus subtypes.